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1,146,892



PATENT SPECIFICATION

DRAWINGS ATTACHED

1,146,892

Date of Application and filing Complete Specification: 16 March, 1966.
No. 11586/66.

Complete Specification Published: 26 March, 1969.

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Index at acceptance:—B2 E1H; E2 A (H21X, H24C2)

Int. Cl.:—F 16 b 47/00

COMPLETE SPECIFICATION

Holding Device for Attaching Articles to Surfaces

I, BRUCE JEROME FRYE, a citizen of the United States of America, of 1806 Longview Drive, New Brighton, Minnesota 55112, United States of America, do hereby declare the invention, for which I pray that a patent

showing portions thereof in separated position; Fig. 5 is a view as rear elevation taken on line 5—5 of Fig. 3 as indicated.

Figs. 6 and 7 are fragmentary views similar to Fig. 2 respectively showing modifications of the device of the invention.

SPECIFICATION NO. 1,146,892

INVENTOR: BRUCE JEROME FRYE

By a direction given under Section 17 (1) of the Patents Act 1949 this application proceeded in the name of VACU-PLASTICS INC. a Corporation organised under the laws of the State of Minnesota, United States of America, of 468 Temperance Street, St. Paul, Minnesota 55101, United States of America.

THE PATENT OFFICE

D 117572/8

with non-adherent means disposed between the separated portions.

Preferably at least the major face of the body portion of the device which adheres to the supporting surface is self adhesive.

The major surface can be either naturally self-adhesive or may have an applied self-adhesive such as a pressure sensitive adhesive.

The holding device may be formed of flexible plastics sheet material.

So that the invention will be more fully understood it will be further described by way of example and with reference to the accompanying drawings in which:—

Figure 1 is a plan view of a device according to the invention with a portion thereof shown in dotted line;

Figure 2 is a view on an enlarged scale in vertical section taken on line 2—2 of Figure 1 as indicated;

Figure 3 is a view of the device of the invention in side elevation shown in an operating position supporting a hanger with a work piece in broken view supported thereby;

Fig. 4 is an exploded view of the device

polyvinyl chloride, which has been found to be unusually satisfactory. The presence of this naturally self adhesive or holding characteristic is dependent upon this material having a very smooth surface. Naturally self adhesive materials are, of course, known in the art. Hence, the outwardly facing sides 15 and 16 of said layers 12 and 14 comprise such smooth surfaces having very good adherence to smooth relatively non-porous surfaces as ceramic, rigid plastic tile, glass, porcelain and painted enamel surfaces.

Thus the surfaces of said device form non-tacky non-sticky holding surfaces which nevertheless adhere to smooth surfaces and this adhesive characteristic is retained by said surfaces 15 and 16 relatively indefinitely.

The invention herein has to do with the unique structural arrangement and construction of the device to provide substantial load bearing capacity while allowing for easy removal.

The central portions of the facing sides of said layers 12 and 14 are indicated by the reference numerals 17 and 18. In a manner

[Pr

SPECIFICATION AMENDED - SEE ATTACHED SLIP



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I, BRUCE JEROME FRYE, a citizen of the United States of America, of 1806 Longview Drive, New Brighton, Minnesota 55112, United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to flexible holding devices of the kind by means of which an article can be attached to a surface but allowing ready removal therefrom if so desired.

To this end, the invention provides a holding device for attaching an article to a supporting surface and adapted to be adhered to said supporting surface comprising a flexible body portion having an inward peripheral slit extending at least partially thereabout to form a marginal portion having separated portions with non-adherent means disposed between the separated portions.

Preferably at least the major face of the body portion of the device which adheres to the supporting surface is self adhesive.

The major surface can be either naturally self-adhesive or may have an applied self-adhesive such as a pressure sensitive adhesive.

The holding device may be formed of flexible plastics sheet material.

So that the invention will be more fully understood it will be further described by way of example and with reference to the accompanying drawings in which:—

Figure 1 is a plan view of a device according to the invention with a portion thereof shown in dotted line;

Figure 2 is a view on an enlarged scale in vertical section taken on line 2—2 of Figure 1 as indicated;

Figure 3 is a view of the device of the invention in side elevation shown in an operating position supporting a hanger with a work piece in broken view supported thereby;

Fig. 4 is an exploded view of the device

showing portions thereof in separated position;

Fig. 5 is a view as rear elevation taken on line 5—5 of Fig. 3 as indicated.

Figs. 6 and 7 are fragmentary views similar to Fig. 2 respectively showing modifications of the device of the invention;

Fig. 8 shows another modification of the device in plan view;

Fig. 9 is a view similar to Fig. 4 showing a modification thereof; and

Figs. 10 and 11 are broken views in perspective showing modifications of the invention herein.

Referring to the drawings, a preferred embodiment of the invention herein is disclosed in the form of the device indicated generally by the reference numeral 10. Said device comprises a pair of superposed layers 12 and 14 of a flexible sheet material having a naturally self adhesive characteristic, such as plasticized polyvinyl chloride, which has been found to be unusually satisfactory. The presence of this naturally self adhesive or holding characteristic is dependent upon this material having a very smooth surface. Naturally self adhesive materials are, of course, known in the art. Hence, the outwardly facing sides 15 and 16 of said layers 12 and 14 comprise such smooth surfaces having very good adherence to smooth relatively non-porous surfaces as ceramic, rigid plastic tile, glass, porcelain and painted enamel surfaces.

Thus the surfaces of said device form non-tacky non-sticky holding surfaces which nevertheless adhere to smooth surfaces and this adhesive characteristic is retained by said surfaces 15 and 16 relatively indefinitely.

The invention herein has to do with the unique structural arrangement and construction of the device to provide substantial load bearing capacity while allowing for easy removal.

The central portions of the facing sides of said layers 12 and 14 are indicated by the reference numerals 17 and 18. In a manner

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SPECIFICATION ATTACHED - SEE ATTACHED SLIP

well known in the art said central portions of said facing sides 17 and 18 are bonded or fused together so as to form the integral portion indicated by the reference numeral 19.

5 The marginal portions 21 and 22 of said layers 12 and 14 are arranged to have their facing surface portions 25 and 26 non-adhesive or free from adherence with one another. Thus said device 10 has separated marginal portions
10 having non-adhesive facing surfaces. The marginal portions are shown as being somewhat fanned out in Figs. 2, 6 and 7 for purposes of illustration only. This structural result may be attained in various ways. In Fig. 4 there
15 is shown a sheet 29 in the form of a frame interposed between the layers 12 and 14 and formed of a material which will not bond with or adhere to the material of said layers 12 and 14. Cellulose acetate among other sub-
20 stances has been found to form a very suitable material for this purpose having a higher melting point than that of the material of said layers 12 and 14. The center cut out portion of said sheet 29 is indicated by the reference
25 numeral 30.

In actual practice the sandwich-like arrangement of the sheets 12 and 14 with the sheet 29 interposed therebetween are placed in a press as a unit and subjected to pressure and
30 heat of a suitable degree to bond or fuse said central portion 19. With all three layers being placed in a press as a unit there results a uniform thickness throughout the full extent of the device.

35 In actual practice, an unpolished polyvinyl chloride material is used for the sheets 12 and 14. The heat and pressure used in bonding the central portion of the device is applied to said outward facing surfaces 15 and 16 and
40 thus provides a very smooth surface having natural self adhesive properties.

It will be understood that the separated marginal portions may extend only partially about or at opposite sides of the body portion
45 as well as completely thereabout as shown.

The novel construction of the device herein provides a unique structure which translates into shear forces those peel forces which arise from the load being borne by the device. The
50 structure of the device which comprises the invention herein has a great capacity to withstand shear force and thus there results a device having great load bearing capacity. It has been found that the device has a great deal
55 more load bearing capacity than appears to be required for its normal and ordinary uses. At the same time, removal from the supporting surface is easily accomplished by peeling back an outer edge portion of the device.

60 So long as there are insignificant peel forces bearing on the outer edges of the device, there is little tendency for said edge portions to peel back or away from the supporting surface. The effect of the load is transferred through the
65 central portion 19 of the device. With no out-

side air being admitted under said central portion, such as would be permitted by the peel back of an outer edge portion, the device maintains its holding power.

The device herein is shown in operating position in Figs. 3 and 5. In being put to use, the object or article to be supported by the device herein such as the hanger 35 will have a smooth relatively non-porous back surface
70 36, such as of Formica.

All surfaces to be secured or stuck together should be clean and free from soil and free from traces of oil which might be secreted by a person's fingers. The surface 36 is then pressed onto an outer surface of said device, such as surface 16. The hanger 35 with the device 10 stuck thereto is then pressed onto a supporting surface, such as surface 38. No great amount of pressure need be exerted. However, sufficient pressure should be applied
80 85 so that the marginal portions of the outer facing surfaces have good sealing engagement with the adjacent facing or mating supported and supporting surfaces. So long as said marginal outer facing surface portions maintain good sealing engagement, the device will exert its maximum load bearing capacity.

When a load 40 is placed or hung onto said hanger 35, the facing surfaces of the marginal portions tend to separate. Here the upper marginal portions tend to separate in response to a downward pull. The full extent of the marginal portions would tend to separate from one another in response to an outward pull. Hence the load is borne by the centrally fused or bonded portion of the device and there is no direct load borne by the marginal portions. With no direct pull being exerted on said marginal portions and particularly at the outer edges thereof, peel back is avoided and a maximum sealing effect is maintained.

Referring to Figs. 2, 3 and 5, a rear view is shown as indicated of the outer surface 15 adhering to the supporting surface 38. The effect of the load 40 in bearing on the surface 15 is illustrated by the upward extension of the air space 42. The holding characteristic of the material used is not fully understood but it appears that it results from several factors. For example, it is probable that when a smooth surface 15 of device 10 is pressed against the smooth supporting surface 38, a large part of the air is excluded from between the surfaces, whereupon atmospheric pressure exerts an unbalanced force on the outer surface of the layer 12 or 14. With this pressure, the coefficient of friction between the smooth surface 15 and the supporting surface 38 is sufficient to retain the device in mounted position against the force of gravity. It is also probable that due to the smooth nature of the surface 15 of the device 10 and of the supporting surface 38, a certain degree of molecular adhesion is obtained in accordance with the well known principles of the Johannsen gauge
100 105 110 115 120 125 130

blocks. The self adhesive characteristics of such smooth surfaced plastic materials were retained even when they were placed in a bell jar and air exhausted therefrom; although the surface was smooth to the touch without a semblance of tackiness and even though the supporting surface was perfectly clean and dry, it remained mounted on the surface in the vacuum.

It has been found that the device herein when of the order of one inch (2.5 cm.) square is of sufficient size to support a load up to six pounds (2.7 kg.) for an indefinite period of time. The device is readily removed by peeling back or freeing the outer faces of the marginal portions from adjacent surfaces to which they are adhering.

With reference to Fig. 6, the device 10¹ is shown of the same structure as the device 10 modified only to the extent that in lieu of the single sheet 29 separating the marginal portions 21 and 22, there is interposed a double layer of material comprising layers 50 and 51, frame-like in form, which are non-adhesive relative to one another but which readily bond to the adjacent surfaces of said marginal portions when the device is placed under pressure and heat as above described. Thus there is a tendency here for said layers 50 and 51 to add body to said marginal portions 21 and 22 and this appears to improve the holding capacity of the device. Ordinary tissue paper has been found to be very suitable for this purpose.

Fig. 7 illustrates the device 10¹¹ which is another modification similar to that shown in Fig. 6 wherein a suitable coating material 53 is applied to the facing surfaces of the marginal portions. Said coating material will be of such character as to bond to the facing surfaces of the marginal portions yet the facing surfaces of the coating material will be non-adhesive as to one another. Such a coating may be applied as by a silk screen process.

In Fig. 8, the device here shown comprises in integral association as a unitary device a plurality of the individual devices 10 and is indicated generally by the reference numeral 55.

The construction here is identified with that described in connection with the device 10 with a marginal separated portion 56 thereabout and in spaced relation therein are bonded or fused areas here shown to be three in number indicated by the reference numerals 57, 58 and 59. Separated portions 61 and 62 extend transversely between the respective bonded areas. It is obvious that the portions 61 and 62 would form marginal portions were the device 55 divided into three devices each having a single bonded area as in the case of the device 10.

In the structure here shown there is provided a device having a substantially greater load bearing capacity than is present with the use

of a single device 10. Thus there is provided a device which may be formed having a plurality of bonded areas.

With reference to Fig. 9, a device 70 is shown which is like the device 10 above described, having its like portions indicated by like characters. The device 70 differs from the device 10 in having one outward facing surface, such as surface 21, coated with a suitable adhesive 71 and having said adhesive coat protected by a liner 72, as required. It will, of course, be appreciated that both surfaces of device 70 may be coated with a suitable adhesive.

Thus the device 70 has a greater range of application than does the device 10. The surface or surfaces in having an adhesive applied thereto is not limited in use to being applied to a smooth non-porous surface but may be applied and secured to porous or non-smooth surfaces, or it may have secured to it objects having various surface conditions. In all other respects, the operation and use characteristics of the device 70 are the same as those above described in connection with said device 10.

As used herein, the term "naturally self adhesive surface" describes a very smooth surface having a natural clinging property whereby said surface will adhere to a variety of other smooth surfaces and does not depend upon the strong polar attraction of bonding that is characterized by adhesives such as pressure-sensitive, heat-activatable, and solvent-activatable adhesives for its adhesive properties.

WHAT WE CLAIM IS:—

1. A holding device for attaching an article to a supporting surface and adapted to be adhered to said supporting surface comprising a flexible body portion having an inward peripheral slit extending at least partially thereabout to form a marginal portion having separated portions with non-adherent means disposed between the separated portions.

2. A holding device according to claim 1 in which at least the major face of the body portion of the device which adheres to the supporting surface is self adhesive.

3. A holding device according to claim 2 in which the said major surface is "naturally" self adhesive.

4. A holding device according to claim 2 in which the said major surface is coated with pressure sensitive adhesive.

5. A holding device according to any preceding claim wherein the body portion comprises layers of sheet material.

6. A holding device according to any preceding claim wherein the peripheral slit extends inwardly of said body portion parallel to the plane of the surfaces thereof.

7. A holding device according to any preceding claim wherein the non-adherent means comprises a non-adhesive layer of sheet material.

8. A holding device substantially as herein described with reference to the accompanying drawings.

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FIG. 1

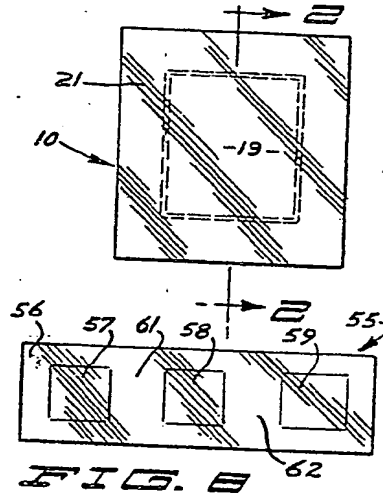


FIG. 3

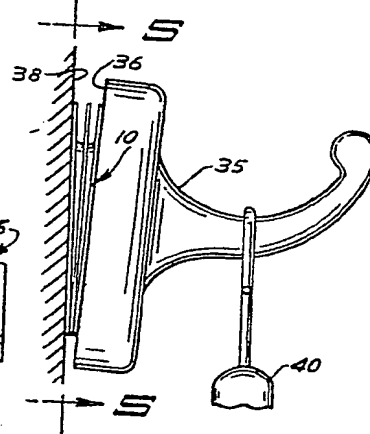


FIG. 2

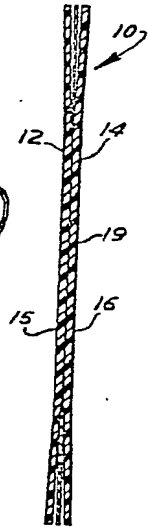


FIG. 4

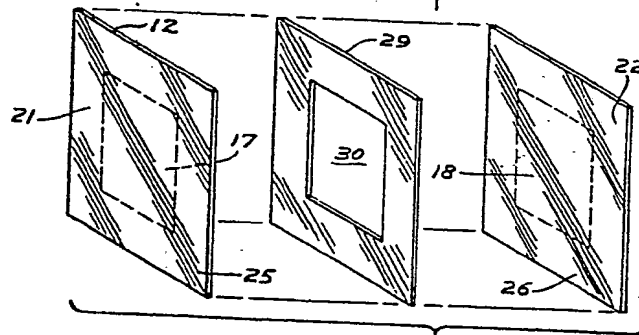


FIG. 6

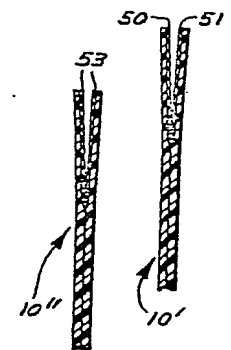


FIG. 4

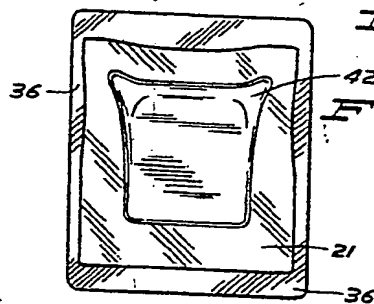


FIG. 5

FIG. 7

1146892 COMPLETE SPECIFICATION

2 SHEETS This drawing is a reproduction of
the Original on a reduced scale
Sheets 1 & 2

